

# Instructional Focus Document

## Grade 7 Mathematics

TITLE : Unit 07: Circles and Composite Figures

SUGGESTED DURATION : 13 days

### UNIT OVERVIEW

#### **Introduction**

This unit bundles student expectations that address conversions between measurement systems, relationships between the diameter and circumference of a circle, and problem situations involving the circumference and area of circles and the area of composite figures. According to the Texas Education Agency, mathematical process standards including application, a problem-solving model, tools and techniques, communication, representations, relationships, and justifications should be integrated (when applicable) with content knowledge and skills so that students are prepared to use mathematics in everyday life, society, and the workplace. The introduction to the grade level standards state, "While the use of all types of technology is important, the emphasis on algebra readiness skills necessitates the implementation of graphing technology."

#### **Prior to this Unit**

In Grade 6, students determined solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles where the dimensions were positive rational numbers. In Grade 7 Unit 03, students used proportions and unit rates as they extended previous understandings of converting units within a measurement system to include converting units between both customary and metric measurement systems.

#### **During this Unit**

Students convert between measurement systems, customary to metric and metric to customary. Solution strategies may include dimensional analysis using unit rates, scale factor between ratios, proportions, and conversion graphs. Students use models to determine the approximate formulas for the circumference and area of a circle (e.g., the circumference of a circle is a little more than three times the length of the diameter of a circle; the circumference of a circle is a little more than three times twice the length of the radius of a circle or a little more than 6 times the radius; the area of a circle is a little more than three times the length of the radius squared). Students use the relationships from models to connect to the actual formulas for the circumference and area of a circle and apply these formulas to solve problems involving the circumference and area of circles. Students extend previous knowledge of the area of rectangles, parallelograms, trapezoids, and triangles along with the new understandings of the circumference and area of circles to solve problems involving area of composite figures that consist of rectangles, triangles, parallelograms, squares, quarter circles, semicircles, and trapezoids.

Other considerations: Reference the [Mathematics COVID-19 Gap Implementation Tool Grade 7](#)

#### **After this Unit**

In Unit 12, students will continue to investigate circles and composite figures as they examine the essential understandings of geometry. In Grade 8, students will extend their knowledge of circles to finding the volume and surface area of cylinders, cones, and spheres.

#### **Additional Notes**

In Grade 7, converting between measurement systems is identified as STAAR Supporting Standard 7.4E and describing  $p$  as the ratio of the circumference of a circle to its diameter is identified as STAAR Supporting Standard 7.5B. Both of these standards are subsumed under the Grade 7 *Texas Response to Curriculum Focal Points* (TxRCFP): Representing and applying proportional relationships. Determining the circumference of circles, area of circles, and the area of composite figures containing combinations of

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rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles are identified as STAAR Readiness Standard 7.9B and 7.9C. These four standards are listed under the Grade 7 STAAR Reporting Category: Geometry and Measurement. Using models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formula is identified as standard 7.8C. This standard is neither Supporting nor Readiness, but is foundational to the conceptual understanding of geometry and measurement. These standards are part of the Grade 7 Focal Point: Using expressions and equations to describe relationships in a variety of contexts, including geometric problems (TxRCFP). This unit is supporting the development of the *Texas College and Career Readiness Standards* (TxCCRS): I. Numeric Reasoning A2, B1, C2; II. Algebraic Reasoning D1, D2; III. Geometric and Spatial Reasoning A2, C1, D1, D3; V. Statistical Reasoning A1, C2; VII. Problem Solving and Reasoning A1, A2, A3, A4, A5, B1, C1, D1, D2; VIII. Communication and Representation A1, A2, A3, B1, B2, C1, C2, C3; IX. Connections A1, A2, B1, B2, B3.

### **Research**

According to *Curriculum and Evaluation Standards for School Mathematics* (1989) by the National Council of Teachers of Mathematics (NCTM), “Geometric models provide a perspective from which students can analyze and solve problems, and geometric interpretations can help make an abstract (symbolic) representation more easily understood. Many real-world objects can be viewed geometrically. For example, the use of area models provides the interpretation for much of the arithmetic of decimals, fractions, ratios, proportions, and percents. At the middle school level, geometry should focus on investigating and using geometric ideas and relationships rather than on memorizing definitions and formulas” (p. 112). As students develop concepts of length and area, it should be noted that “Students need to become fluent in the use of procedures or formulas to solve problems; however, they also need to learn those skills with understanding rather than just through memorization. Algorithms and formulas have the potential to simplify calculation and clarify topics, but without understanding they can become an impediment to further learning” (NCTM, 2009, p. 7).

National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics, Inc.

National Council of Teachers of Mathematics. (2009). *Focus in Grades 6 – 8: Teaching with curriculum focal points*. Reston, VA: National Council of Teachers of Mathematics, Inc.

Texas Education Agency & Texas Higher Education Coordinating Board. (2009). *Texas college and career readiness standards*. Retrieved from <http://www.theceb.state.tx.us/institutional-resources-programs/public-community-technical-state-colleges/texas-college-and-career-readiness-standards/>

Texas Education Agency. (2013). *Texas response to curriculum focal points for kindergarten through grade 8 mathematics*. Retrieved from <https://www.texasgateway.org/resource/txrcfp-texas-response-curriculum-focal-points-k-8-mathematics-revised-2013>

## OVERARCHING UNDERSTANDINGS AND QUESTIONS

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Quantitative relationships model problem situations efficiently and can be used to make generalizations, predictions, and critical judgements in everyday life.

- What patterns exist within different types of quantitative relationships and where are they found in everyday life?
- Why is the ability to model quantitative relationships in a variety of ways essential to solving problems in everyday life?

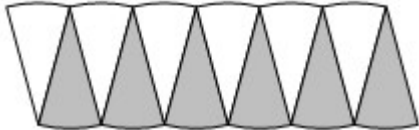
UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
<p>Understanding how two quantities vary together (covariation) and can be reasoned up and down in situations involving invariant (constant) relationships builds flexible proportional reasoning in order to make predictions and critical judgements about the relationship.</p> <ul style="list-style-type: none"> <li>• Analyzing geometric relationships in models aids in representing the attributes and quantifiable measures to generalize proportional geometric relationships and solve problems.               <ul style="list-style-type: none"> <li>• What is the relationship between the ...                   <ul style="list-style-type: none"> <li>◊ radius and diameter</li> <li>◊ diameter and circumference</li> <li>◊ radius and circumference</li> </ul>                   ... in a circle?                 </li> <li>• How does the ratio of the circumference of a circle to its diameter compare to other circles?</li> <li>• What symbol is used to represent the ratio of the circumference of a circle to its diameter?</li> </ul> </li> </ul>	<p>Proportionality</p> <ul style="list-style-type: none"> <li>• Ratios</li> <li>• Relationships and Generalizations               <ul style="list-style-type: none"> <li>• Circle relationships</li> </ul> </li> <li>• Representations</li> <li>• Solution Strategies and Algorithms</li> </ul> <p>Expressions, Equations, &amp; Relationships</p> <ul style="list-style-type: none"> <li>• Composition and Decomposition of Figures</li> <li>• Geometric Representations               <ul style="list-style-type: none"> <li>• Two-dimensional figures</li> </ul> </li> <li>• Geometric Relationships               <ul style="list-style-type: none"> <li>• Formulas</li> <li>• Circumference</li> <li>• Area</li> <li>• Measure relationships</li> <li>• Geometric properties</li> </ul> </li> <li>• Representations</li> </ul>	<div style="background-color: #e0e0e0; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;"><a href="#">Mathematics Grade 7 Unit 07 PA 01</a> Click on the PA title to view related rubric.</p> </div> <p><i>Provide various sizes of paper circles for students to select along with measuring tapes or rulers, string, colored pencils, and scissors.</i></p> <p>Analyze the problem situation(s) described below. Organize and record your work for each of the following tasks. Using precise mathematical language, justify and explain each solution process.</p> <ol style="list-style-type: none"> <li>1. Select a paper circle.           <ol style="list-style-type: none"> <li>a. Using a piece of string and measuring tape or ruler, measure and record the length of the radius, diameter, and circumference of the circle.</li> <li>b. Describe the relationship between the ratio of the circumference of a circle and its diameter and how this ratio is related to <math>\pi</math>.</li> </ol> </li> </ol>

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
<p>Illustrating and analyzing geometric relationships in models and diagrams aid in representing attributes of geometric figures with quantifiable measures and equations in order to generalize geometric relationships and solve problems.</p> <ul style="list-style-type: none"> <li>• How can decomposition and composition of figures simplify the measurement process?</li> <li>• How can a parallelogram that is created by rearranging equal-sized pieces of a circle be used to find the ...               <ul style="list-style-type: none"> <li>◊ area</li> <li>◊ circumference</li> </ul>               ... of the circle?             </li> <li>• How is the formula for the area of a parallelogram related to the formula for the area of a circle?</li> <li>• What is the process to determine the circumference of a circle ...               <ul style="list-style-type: none"> <li>◊ if the diameter is known?</li> <li>◊ if the radius is known?</li> </ul> </li> <li>• What is the process to determine the ...               <ul style="list-style-type: none"> <li>◊ diameter</li> <li>◊ radius</li> </ul>               ... if the circumference is known?             </li> </ul>	<p><u>Associated Mathematical Processes</u></p> <ul style="list-style-type: none"> <li>• Application</li> <li>• Problem Solving Model</li> <li>• Tools and Techniques</li> <li>• Communication</li> <li>• Representations</li> <li>• Relationships</li> <li>• Justification</li> </ul>	<ul style="list-style-type: none"> <li>c. Using a piece of string and your paper circle, approximate the formulas for the circumference of a circle in terms of the radius and <math>\pi</math> and in terms of the diameter and <math>\pi</math>.</li> <li>d. Explain the connection between your formulas and the actual formulas for the circumference of a circle, <math>C = 2\pi r</math> and <math>C = \pi d</math>.</li> <li>e. Determine the circumference of your paper circle.</li> <li>f. Fold the circle in half and shade one-half of the circle with a colored pencil. Continue to fold the circle to create 8 to 12 equal-size pieces. Cut the circle into equal-size pieces from the center of the circle to the outside of the circle where the length of the non-curved side is the length of the radius of the circle. Lay the equal-size pieces next to each other, alternating shaded sections and unshaded sections, to create a figure similar to the shape below.               <div style="text-align: center; margin: 10px 0;">  </div> </li> <li>g. Use your model to determine an approximate formula for the area of the circle in terms of the radius and <math>\pi</math>.</li> <li>h. Explain the connection between your formula and the actual formula for the area of a circle,</li> </ul>

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
		$A = \pi r^2$ . i. Determine the area of your paper circle.  Standard(s): <a href="#">7.1A</a> , <a href="#">7.1B</a> , <a href="#">7.1C</a> , <a href="#">7.1D</a> , <a href="#">7.1E</a> , <a href="#">7.1F</a> , <a href="#">7.1G</a> , <a href="#">7.5B</a> , <a href="#">7.8C</a> , <a href="#">7.9B</a> , <a href="#">ELPS.c.1A</a> , <a href="#">ELPS.c.2C</a> , <a href="#">ELPS.c.2D</a> , <a href="#">ELPS.c.2E</a> , <a href="#">ELPS.c.3C</a> , <a href="#">ELPS.c.3D</a> , <a href="#">ELPS.c.3H</a> , <a href="#">ELPS.c.4C</a> , <a href="#">ELPS.c.4D</a> , <a href="#">ELPS.c.4F</a> , <a href="#">ELPS.c.4H</a> , <a href="#">ELPS.c.5B</a> , <a href="#">ELPS.c.5F</a> , <a href="#">ELPS.c.5G</a>

### OVERARCHING UNDERSTANDINGS AND QUESTIONS

Quantitative relationships model problem situations efficiently and can be used to make generalizations, predictions, and critical judgements in everyday life.

- What patterns exist within different types of quantitative relationships and where are they found in everyday life?
- Why is the ability to model quantitative relationships in a variety of ways essential to solving problems in everyday life?

UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
Understanding how two quantities vary together (covariation) and can be reasoned up and down in situations involving invariant (constant) relationships builds flexible proportional reasoning in order to make predictions	Proportionality <ul style="list-style-type: none"> <li>• Ratios and Rates</li> <li>• Unit rates</li> <li>• Scale factors</li> </ul>	<div style="background-color: #e0e0e0; padding: 5px; margin-bottom: 5px;"> <a href="#">Mathematics Grade 7 Unit 07 PA 02</a>                          Click on the PA title to view related rubric.                     </div> Analyze the problem situation(s) described below. Organize

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<p>and critical judgements about the relationship.</p> <ul style="list-style-type: none"> <li>Unit rate and constant rate of change represent equivalent values and are used to solve problems involving a proportional relationship.               <ul style="list-style-type: none"> <li>How are ...                   <ul style="list-style-type: none"> <li>scale factors</li> <li>proportions</li> <li>unit rates</li> <li>conversion graphs</li> </ul> </li> </ul> <p>... used to convert from one measurement system to another?</p> <p>Illustrating and analyzing geometric relationships in models and diagrams aid in representing attributes of geometric figures with quantifiable measures and equations in order to generalize geometric relationships and solve problems.</p> <ul style="list-style-type: none"> <li>How can geometric, spatial, and measurement reasoning affect how one visualizes composite figures?</li> <li>How can composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles be decomposed and/or composed to simplify the measurement process?</li> <li>What is the process to determine the area of a composite figure?</li> <li>How can the area of a composite figure be represented</li> </ul> </li></ul>	<ul style="list-style-type: none"> <li>Generalizations and relationships               <ul style="list-style-type: none"> <li>Equivalence</li> <li>Representations</li> </ul> </li> <li>Systems of Measurement               <ul style="list-style-type: none"> <li>Customary</li> <li>Metric</li> </ul> </li> </ul> <p>Expressions, Equations, &amp; Relationships</p> <ul style="list-style-type: none"> <li>Composition and Decomposition of Figures</li> <li>Geometric Representations               <ul style="list-style-type: none"> <li>Two-dimensional figures</li> <li>Composite figures</li> </ul> </li> <li>Geometric Relationships               <ul style="list-style-type: none"> <li>Formulas</li> <li>Area</li> <li>Measure relationships</li> <li>Geometric properties</li> </ul> </li> <li>Representations</li> </ul> <p><u>Associated Mathematical Processes</u></p> <ul style="list-style-type: none"> <li>Application</li> <li>Problem Solving Model</li> <li>Tools and Techniques</li> <li>Communication</li> <li>Representations</li> <li>Relationships</li> <li>Justification</li> </ul>	<p>and record your work for each of the following tasks. Using precise mathematical language, justify and explain each solution process.</p> <ol style="list-style-type: none"> <li>A local park created a botanical garden represented by the shaded region in the diagram below.           <div style="text-align: center;"> </div> <ol style="list-style-type: none"> <li>The park staff plans to purchase mulch to cover the botanical garden. Determine how many square meters of the garden will be covered with mulch. Round your solution to the nearest tenth of a square meter.</li> <li>The park would like to place a small fence around the garden and has estimated the perimeter to be 73.435 meters. Fencing is sold</li> </ol> </li> </ol>


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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
with an equation and/or formula?		<p>by the foot. Determine how many feet of fencing the park should purchase to place around the garden if 1 foot = 0.3048 meters. Round your solution to the nearest foot.</p> <p>Standard(s): <a href="#">7.1A</a>, <a href="#">7.1B</a>, <a href="#">7.1C</a>, <a href="#">7.1D</a>, <a href="#">7.1E</a>, <a href="#">7.1F</a>, <a href="#">7.1G</a>, <a href="#">7.4E</a>, <a href="#">7.9C</a>, <a href="#">ELPS.c.1A</a>, <a href="#">ELPS.c.2C</a>, <a href="#">ELPS.c.2D</a>, <a href="#">ELPS.c.2E</a>, <a href="#">ELPS.c.3C</a>, <a href="#">ELPS.c.3D</a>, <a href="#">ELPS.c.3H</a>, <a href="#">ELPS.c.4C</a>, <a href="#">ELPS.c.4D</a>, <a href="#">ELPS.c.4F</a>, <a href="#">ELPS.c.4H</a>, <a href="#">ELPS.c.5B</a>, <a href="#">ELPS.c.5F</a>, <a href="#">ELPS.c.5G</a></p>

 MISCONCEPTIONS / UNDERDEVELOPED CONCEPTS
<p><b>Misconceptions:</b></p> <ul style="list-style-type: none"> <li>• Some students may think the area of a composite figure changes rather than remaining the same when the figure is disassembled.</li> <li>• Some students may confuse the formulas for the circumference and area of a circle.</li> <li>• Some students may multiply the radius by 2 rather than squaring it when determining the area of a circle.</li> </ul>

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### UNIT VOCABULARY

- **Area** – the measurement attribute that describes the number of square units a figure or region covers
- **Circle** – a two-dimensional figure formed by a closed curve with all points equal distance from the center
- **Circumference** – a linear measurement of the distance around a circle
- **Composite figure** – a figure that is composed of two or more two-dimensional figures
- **Diameter** – a line segment whose endpoints are on the circle and passes through the center of the circle
- **Pi ( $\pi$ )** – the ratio of the circumference to the diameter of a circle
- **Positive rational numbers** – the set of numbers that can be expressed as a fraction  $\frac{a}{b}$ , where  $a$  and  $b$  are counting (natural) numbers
- **Quarter circle** – one-fourth of a circle
- **Radius** – a line segment drawn from the center of a circle to any point on the circle and is half the length of the diameter of the circle
- **Semicircle** – half of a circle
- **Two-dimensional figure** – a figure with two basic units of measure, usually length and width

#### Related Vocabulary:

- |   |  |  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• Circle</li> <li>• Conversion graph</li> <li>• Customary</li> <li>• Dimensional analysis</li> <li>• Line segment</li> <li>• Measurement system</li> </ul> | <ul style="list-style-type: none"> <li>• Metric</li> <li>• Parallelogram</li> <li>• Polygon</li> <li>• Proportion</li> <li>• Quadrilateral</li> <li>• Ratio</li> </ul> | <ul style="list-style-type: none"> <li>• Rectangle</li> <li>• Rhombus</li> <li>• Scale factor</li> <li>• Square</li> <li>• Trapezoid</li> <li>• Triangle</li> <li>• Unit rate</li> </ul> |
|---|--|--|

UNIT ASSESSMENT ITEMS	SYSTEM RESOURCES	OTHER RESOURCES
Unit Assessment Items that have been published by your district may be accessed through <a href="#">Search All Components</a> in the District Resources tab. Assessment items may also be found using the	<a href="#">Mathematics Concepts Charts</a>  <a href="#">Mathematics COVID-19 Gap Implementation Tool Grade 7</a>	Texas Higher Education Coordinating Board – <a href="#">Texas College and Career Readiness Standards</a>  Texas Education Agency – <a href="#">Texas Response to</a>



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Assessment Center if your district has granted access to that tool.

[Mathematics COVID-19 Gap Implementation Tool Instructions](#)

[Mathematics Grade 7 Backward Design Document](#)

[Mathematics Grade 7 Enhanced TEKS Clarification](#)

[Mathematics Grade 7 Focal Points with Aligned Standards and TEKS Introduction](#)

[Mathematics Grade 7 STAAR Analysis Resources](#)

[Mathematics Grade 7 STAAR Blueprint and Item Percentages](#)

[Mathematics Grade 7 STAAR Enhanced Blueprint](#)

[Mathematics Grade 7 Vertical Alignment](#)

[Mathematics Grade 7 Unit 07 TEKS Resource System STAAR Analysis](#)

[Mathematics K-HS Overarching Understandings and Questions](#)

[Mathematics Long Term Transfer Goals](#)

[Mathematics Suggested Basic Manipulatives by Grade Level](#)

[Mathematics Suggested Engaging Literature](#)

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[Curriculum Focal Points for K-8 Mathematics Revised 2013](#)

Texas Education Agency – [Mathematics Curriculum](#)

Texas Education Agency – [STAAR Mathematics Resources](#)

Texas Education Agency Texas Gateway – [Revised Mathematics TEKS: Vertical Alignment Charts](#)

Texas Education Agency Texas Gateway – [Mathematics TEKS: Supporting Information](#)

Texas Education Agency Texas Gateway – [Interactive Mathematics Glossary](#)

Texas Education Agency Texas Gateway – [Resources Aligned to Grade 7 Mathematics TEKS](#)

Texas Instruments – [Graphing Calculator Tutorials](#)

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[Mathematics Texas Education Agency Grade 7 TEKS Supporting Information \(with TEKS Resource System Comments\)](#)

[Mathematics Vertical Quick Guide](#)

### TAUGHT DIRECTLY TEKS

TEKS INTENDED TO BE EXPLICITLY TAUGHT IN THIS UNIT.

TEKS/SE Legend:

- *Knowledge and Skills Statements (TEKS) identified by TEA are in italicized, bolded, black text.*
- **Student Expectations (TEKS) identified by TEA are in bolded, black text.**
- **Student Expectations (TEKS) are labeled Readiness as identified by TEA of the assessed curriculum.**
- *Student Expectations (TEKS) are labeled Supporting as identified by TEA of the assessed curriculum.*
- *Student Expectations (TEKS) are labeled Process standards as identified by TEA of the assessed curriculum.*
- Portions of the Student Expectations (TEKS) that are not included in this unit but are taught in previous or future units are indicated by a ~~strike-through~~.

Specificity Legend:

- Supporting information / clarifications (specificity) written by TEKS Resource System are in blue text.
- *Unit-specific clarifications are in italicized, blue text.*
- Information from Texas Education Agency (TEA), Texas College and Career Readiness Standards (TxCCRS), Texas Response to Curriculum Focal Points (TxRCFP) is labeled.
- A **Partial Specificity** label indicates that a portion of the specificity not aligned to this unit has been removed.

TEKS# SE#	TEKS	SPECIFICITY
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<a href="#">7.1</a>	<b>Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</b>	
<a href="#">7.1A</a>	<p><b>Apply mathematics to problems arising in everyday life, society, and the workplace.</b>  <i>Process Standard</i></p>	<p>Apply</p> <p>MATHEMATICS TO PROBLEMS ARISING IN EVERYDAY LIFE, SOCIETY, AND THE WORKPLACE</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Mathematical problem situations within and between disciplines               <ul style="list-style-type: none"> <li>◊ Everyday life</li> <li>◊ Society</li> <li>◊ Workplace</li> </ul> </li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• The mathematical process standards may be applied to all content standards as appropriate.</li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◊ Developing fluency with rational numbers and operations to solve problems in a variety of contexts</li> <li>◊ Representing and applying proportional relationships</li> <li>◊ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> <li>◊ Comparing sets of data</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◊ VII.D. Problem Solving and Reasoning – Real-world problem solving                   <ul style="list-style-type: none"> <li>• VII.D.1. Interpret results of the mathematical problem in terms of the original real-world situation.</li> </ul> </li> <li>◊ IX.A. Connections – Connections among the strands of mathematics                   <ul style="list-style-type: none"> <li>• IX.A.1. Connect and use multiple key concepts of mathematics in situations and</li> </ul> </li> </ul> </li> </ul>

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TEKS# SE#	TEKS	SPECIFICITY
		<p>problems.</p> <ul style="list-style-type: none"> <li>• IX.A.2. Connect mathematics to the study of other disciplines.</li> <li>◊ IX.B. Connections – Connections of mathematics to nature, real-world situations, and everyday life               <ul style="list-style-type: none"> <li>• IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations.</li> <li>• IX.B.2. Understand and use appropriate mathematical models in the natural, physical, and social sciences.</li> <li>• IX.B.3. Know and understand the use of mathematics in a variety of careers and professions.</li> </ul> </li> </ul>
<a href="#">7.1B</a>	<p><b>Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.</b></p> <p><i>Process Standard</i></p>	<p>Use</p> <p>A PROBLEM-SOLVING MODEL THAT INCORPORATES ANALYZING GIVEN INFORMATION, FORMULATING A PLAN OR STRATEGY, DETERMINING A SOLUTION, JUSTIFYING THE SOLUTION, AND EVALUATING THE PROBLEM-SOLVING PROCESS AND THE REASONABLENESS OF THE SOLUTION</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Problem-solving model               <ul style="list-style-type: none"> <li>◊ Analyze given information</li> <li>◊ Formulate a plan or strategy</li> <li>◊ Determine a solution</li> <li>◊ Justify the solution</li> <li>◊ Evaluate the problem-solving process and the reasonableness of the solution</li> </ul> </li> </ul> <p>Note(s):</p>

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TITLE : Unit 07: Circles and Composite Figures

SUGGESTED DURATION : 13 days

TEKS# SE#	TEKS	SPECIFICITY
		<ul style="list-style-type: none"> <li>• <a href="#">The mathematical process standards may be applied to all content standards as appropriate.</a></li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◦ Developing fluency with rational numbers and operations to solve problems in a variety of contexts</li> <li>◦ Representing and applying proportional relationships</li> <li>◦ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> <li>◦ Comparing sets of data</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◦ I.B. Numeric Reasoning – Number sense and number concepts                   <ul style="list-style-type: none"> <li>• I.B.1. Use estimation to check for errors and reasonableness of solutions.</li> </ul> </li> <li>◦ V.A. Statistical Reasoning – Design a study                   <ul style="list-style-type: none"> <li>• V.A.1. Formulate a statistical question, plan an investigation, and collect data.</li> </ul> </li> <li>◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving                   <ul style="list-style-type: none"> <li>• VII.A.1. Analyze given information.</li> <li>• VII.A.2. Formulate a plan or strategy.</li> <li>• VII.A.3. Determine a solution.</li> <li>• VII.A.4. Justify the solution.</li> <li>• VII.A.5. Evaluate the problem-solving process.</li> </ul> </li> <li>◦ VII.D. Problem Solving and Reasoning – Real-world problem solving                   <ul style="list-style-type: none"> <li>• VII.D.2. Evaluate the problem-solving process.</li> </ul> </li> </ul> </li> </ul>
<a href="#">7.1C</a>	<p><b>Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.</b></p> <p><i>Process Standard</i></p>	<p>Select</p> <p><a href="#">TOOLS, INCLUDING REAL OBJECTS, MANIPULATIVES, PAPER AND PENCIL, AND TECHNOLOGY AS APPROPRIATE, AND TECHNIQUES, INCLUDING MENTAL MATH, ESTIMATION, AND NUMBER SENSE AS APPROPRIATE, TO SOLVE PROBLEMS</a></p> <p>Including, but not limited to:</p>

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		<ul style="list-style-type: none"> <li>• Appropriate selection of tool(s) and techniques to apply in order to solve problems               <ul style="list-style-type: none"> <li>◦ Tools                   <ul style="list-style-type: none"> <li>• Real objects</li> <li>• Manipulatives</li> <li>• Paper and pencil</li> <li>• Technology</li> </ul> </li> <li>◦ Techniques                   <ul style="list-style-type: none"> <li>• Mental math</li> <li>• Estimation</li> <li>• Number sense</li> </ul> </li> </ul> </li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• The mathematical process standards may be applied to all content standards as appropriate.</li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◦ Developing fluency with rational numbers and operations to solve problems in a variety of contexts</li> <li>◦ Representing and applying proportional relationships</li> <li>◦ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> <li>◦ Comparing sets of data</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◦ I.B. Numeric Reasoning – Number sense and number concepts                   <ul style="list-style-type: none"> <li>• I.B.1. Use estimation to check for errors and reasonableness of solutions.</li> </ul> </li> <li>◦ V.C. Statistical Reasoning – Analyze, interpret, and draw conclusions from data                   <ul style="list-style-type: none"> <li>• V.C.2. Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.</li> </ul> </li> </ul> </li> </ul>

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TEKS# SE#	TEKS	SPECIFICITY
<a href="#">7.1D</a>	<p><b>Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.</b></p> <p><i>Process Standard</i></p>	<div style="text-align: right; background-color: #fff9c4; padding: 2px;">Partial Specificity</div> <p>Communicate</p> <p>MATHEMATICAL IDEAS, REASONING, AND THEIR IMPLICATIONS USING MULTIPLE REPRESENTATIONS, INCLUDING SYMBOLS, DIAGRAMS, AND LANGUAGE AS APPROPRIATE</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Mathematical ideas, reasoning, and their implications               <ul style="list-style-type: none"> <li>◦ Multiple representations, as appropriate                   <ul style="list-style-type: none"> <li>• Symbols</li> <li>• Diagrams</li> <li>• Language</li> </ul> </li> </ul> </li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• The mathematical process standards may be applied to all content standards as appropriate.</li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◦ Developing fluency with rational numbers and operations to solve problems in a variety of contexts</li> <li>◦ Representing and applying proportional relationships</li> <li>◦ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> <li>◦ Comparing sets of data</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◦ II.D. Algebraic Reasoning – Representing relationships                   <ul style="list-style-type: none"> <li>• II.D.1. Interpret multiple representations of equations, inequalities, and relationships.</li> <li>• II.D.2. Convert among multiple representations of equations, inequalities, and relationships.</li> </ul> </li> </ul> </li> </ul>

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TEKS# SE#	TEKS	SPECIFICITY
		<ul style="list-style-type: none"> <li>◊ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics               <ul style="list-style-type: none"> <li>● VIII.A.1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.</li> <li>● VIII.A.2. Use mathematical language to represent and communicate the mathematical concepts in a problem.</li> <li>● VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing.</li> </ul> </li> <li>◊ VIII.B. Communication and Representation – Interpretation of mathematical work               <ul style="list-style-type: none"> <li>● VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.</li> <li>● VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.</li> </ul> </li> <li>◊ VIII.C. Communication and Representation – Presentation and representation of mathematical work               <ul style="list-style-type: none"> <li>● VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.</li> <li>● VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas.</li> <li>● VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.</li> </ul> </li> <li>◊ IX.B. Connections – Connections of mathematics to nature, real-world situations, and everyday life               <ul style="list-style-type: none"> <li>● IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations.</li> </ul> </li> </ul>
<a href="#"><u>7.1E</u></a>	<b>Create and use representations to organize, record, and communicate mathematical ideas.</b>	<a href="#"><u>Create, Use</u></a>



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	<i>Process Standard</i>	<p>REPRESENTATIONS TO ORGANIZE, RECORD, AND COMMUNICATE MATHEMATICAL IDEAS</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Representations of mathematical ideas               <ul style="list-style-type: none"> <li>◊ Organize</li> <li>◊ Record</li> <li>◊ Communicate</li> </ul> </li> <li>• Evaluation of the effectiveness of representations to ensure clarity of mathematical ideas being communicated</li> <li>• Appropriate mathematical vocabulary and phrasing when communicating mathematical ideas</li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• The mathematical process standards may be applied to all content standards as appropriate.</li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◊ Developing fluency with rational numbers and operations to solve problems in a variety of contexts</li> <li>◊ Representing and applying proportional relationships</li> <li>◊ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> <li>◊ Comparing sets of data</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◊ VIII.B. Communication and Representation – Interpretation of mathematical work                   <ul style="list-style-type: none"> <li>• VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.</li> <li>• VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.</li> </ul> </li> <li>◊ VIII.C. Communication and Representation – Presentation and representation of mathematical work</li> </ul> </li> </ul>

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TEKS# SE#	TEKS	SPECIFICITY
		<ul style="list-style-type: none"> <li>• VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.</li> <li>• VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas.</li> </ul>
<a href="#">7.1F</a>	<p><b>Analyze mathematical relationships to connect and communicate mathematical ideas.</b> <i>Process Standard</i></p>	<p>Analyze</p> <p><b>MATHEMATICAL RELATIONSHIPS TO CONNECT AND COMMUNICATE MATHEMATICAL IDEAS</b></p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Mathematical relationships               <ul style="list-style-type: none"> <li>◦ Connect and communicate mathematical ideas                   <ul style="list-style-type: none"> <li>• Conjectures and generalizations from sets of examples and non-examples, patterns, etc.</li> <li>• Current knowledge to new learning</li> </ul> </li> </ul> </li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• The mathematical process standards may be applied to all content standards as appropriate.</li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◦ Developing fluency with rational numbers and operations to solve problems in a variety of contexts</li> <li>◦ Representing and applying proportional relationships</li> <li>◦ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> <li>◦ Comparing sets of data</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving</li> </ul> </li> </ul>

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TEKS# SE#	TEKS	SPECIFICITY
		<ul style="list-style-type: none"> <li>• VII.A.1. Analyze given information.</li> <li>◊ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics               <ul style="list-style-type: none"> <li>• VIII.A.1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.</li> <li>• VIII.A.2. Use mathematical language to represent and communicate the mathematical concepts in a problem.</li> <li>• VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing.</li> </ul> </li> <li>◊ VIII.B. Communication and Representation – Interpretation of mathematical work               <ul style="list-style-type: none"> <li>• VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.</li> </ul> </li> <li>◊ VIII.C. Communication and Representation – Presentation and representation of mathematical work               <ul style="list-style-type: none"> <li>• VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.</li> <li>• VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas.</li> <li>• VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.</li> </ul> </li> <li>◊ IX.A. Connections – Connections among the strands of mathematics               <ul style="list-style-type: none"> <li>• IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems.</li> <li>• IX.A.2. Connect mathematics to the study of other disciplines.</li> </ul> </li> </ul>
<a href="#"><b>7.1G</b></a>	<b>Display, explain, and justify mathematical ideas and arguments using precise mathematical</b>	<a href="#">Display, Explain, Justify</a>

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TEKS# SE#	TEKS	SPECIFICITY
	<p>language in written or oral communication. <i>Process Standard</i></p>	<p>MATHEMATICAL IDEAS AND ARGUMENTS USING PRECISE MATHEMATICAL LANGUAGE IN WRITTEN OR ORAL COMMUNICATION</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Mathematical ideas and arguments               <ul style="list-style-type: none"> <li>◦ Validation of conclusions                   <ul style="list-style-type: none"> <li>• Displays to make work visible to others                       <ul style="list-style-type: none"> <li>◦ Diagrams, visual aids, written work, etc.</li> </ul> </li> </ul> </li> <li>• Explanations and justifications                   <ul style="list-style-type: none"> <li>◦ Precise mathematical language in written or oral communication</li> </ul> </li> </ul> </li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• The mathematical process standards may be applied to all content standards as appropriate.</li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◦ Developing fluency with rational numbers and operations to solve problems in a variety of contexts</li> <li>◦ Representing and applying proportional relationships</li> <li>◦ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> <li>◦ Comparing sets of data</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving                   <ul style="list-style-type: none"> <li>• VII.A.4. Justify the solution.</li> </ul> </li> <li>◦ VII.B. Problem Solving and Reasoning – Proportional reasoning                   <ul style="list-style-type: none"> <li>• VII.B.1. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations.</li> </ul> </li> <li>◦ VII.C. Problem Solving and Reasoning – Logical reasoning</li> </ul> </li> </ul>

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TEKS# SE#	TEKS	SPECIFICITY
		<ul style="list-style-type: none"> <li>• VII.C.1. Develop and evaluate convincing arguments.</li> <li>◊ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics               <ul style="list-style-type: none"> <li>• VIII. A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing.</li> </ul> </li> <li>◊ VIII.B. Communication and Representation – Interpretation of mathematical work               <ul style="list-style-type: none"> <li>• VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.</li> <li>• VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.</li> </ul> </li> <li>◊ VIII.C. Communication and Representation – Presentation and representation of mathematical work               <ul style="list-style-type: none"> <li>• VIII. C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.</li> </ul> </li> </ul>
<a href="#"><u>7.4</u></a>	<b><i>Proportionality. The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to:</i></b>	
<a href="#"><u>7.4E</u></a>	<b>Convert between measurement systems, including the use of proportions and the use of unit rates.</b> <i>Supporting Standard</i>	Convert  BETWEEN MEASUREMENT SYSTEMS, INCLUDING THE USE OF PROPORTIONS AND THE USE OF UNIT RATES  Including, but not limited to: <ul style="list-style-type: none"> <li>• Positive rational numbers – the set of numbers that can be expressed as a fraction <math>\frac{a}{b}</math>, where <math>a</math></li> </ul>

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TEKS# SE#	TEKS	SPECIFICITY
		<p>and <math>b</math> are counting (natural) numbers</p> <ul style="list-style-type: none"> <li>• Various forms of positive rational numbers               <ul style="list-style-type: none"> <li>◦ Counting (natural) numbers</li> <li>◦ Decimals</li> <li>◦ Fractions</li> </ul> </li> <li>• Convert units between measurement systems.               <ul style="list-style-type: none"> <li>◦ Customary to metric</li> <li>◦ Metric to customary</li> </ul> </li> <li>• Multiple solution strategies               <ul style="list-style-type: none"> <li>◦ Dimensional analysis using unit rates</li> <li>◦ Unit rates</li> <li>◦ Scale factor between ratios</li> <li>◦ Proportion method</li> <li>◦ Conversion graph</li> </ul> </li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• Grade Level(s):               <ul style="list-style-type: none"> <li>◦ Grade 4 converted measurements within the same measurement system, customary or metric, from a smaller unit into a larger unit or a larger unit into a smaller unit when given other equivalent measures represented in a table.</li> <li>◦ Grade 5 solved problems by calculating conversions within a measurement system, customary or metric.</li> <li>◦ Grade 6 converted units within a measurement system, including the use of proportions and unit rates.</li> <li>◦ Various mathematical process standards will be applied to this student expectation as appropriate.</li> </ul> </li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◦ Representing and applying proportional relationships</li> </ul> </li> <li>• TxCCRS:</li> </ul>

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		<ul style="list-style-type: none"> <li>◊ I.A. Numeric Reasoning – Number representations and operations               <ul style="list-style-type: none"> <li>• I.A.2. Perform computations with rational and irrational numbers.</li> </ul> </li> <li>◊ I.C. Numeric Reasoning – Systems of measurement               <ul style="list-style-type: none"> <li>• I.C.2. Convert units within and between systems of measurement.</li> </ul> </li> <li>◊ VII.B. Problem Solving and Reasoning – Proportional reasoning               <ul style="list-style-type: none"> <li>• VII.B.1. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations.</li> </ul> </li> <li>◊ IX.B. Connections – Connections of mathematics to nature, real-world situations, and everyday life               <ul style="list-style-type: none"> <li>• IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations.</li> </ul> </li> </ul>
<a href="#"><u>7.5</u></a>	<b><i>Proportionality. The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to:</i></b>	
<a href="#"><u>7.5B</u></a>	<b>Describe <math>\pi</math> as the ratio of the circumference of a circle to its diameter.</b> <i>Supporting Standard</i>	<p>Describe</p> <p><math>\pi</math> AS THE RATIO OF THE CIRCUMFERENCE OF A CIRCLE TO ITS DIAMETER</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Circle – a two-dimensional figure formed by a closed curve with all points equal distance from the center               <ul style="list-style-type: none"> <li>◊ Diameter – a line segment whose endpoints are on the circle and passes through the center of the circle</li> <li>◊ Radius – a line segment drawn from the center of a circle to any point on the circle and</li> </ul> </li> </ul>

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		<p>is half the length of the diameter of the circle</p> <ul style="list-style-type: none"> <li>◊ Circumference – a linear measurement of the distance around a circle</li> <li>• Pi (<math>\pi</math>) – the ratio of the circumference to the diameter of a circle               <ul style="list-style-type: none"> <li>◊ <math>\pi</math> is represented by the ratio <math>C:d</math></li> <li>◊ <math>\pi = \frac{C}{d}</math> or <math>\pi = \frac{C}{2r}</math></li> <li>◊ <math>\pi \approx 3.14</math> or <math>\frac{22}{7}</math></li> </ul> </li> <li>• Relationship between circumference and diameter</li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• Grade Level(s):               <ul style="list-style-type: none"> <li>◊ Grade 7 introduces describing <math>\pi</math> as the ratio of the circumference of a circle to its diameter.</li> <li>◊ Various mathematical process standards will be applied to this student expectation as appropriate.</li> </ul> </li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◊ Representing and applying proportional relationships</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◊ III.A. Geometric and Spatial Reasoning – Figures and their properties                   <ul style="list-style-type: none"> <li>• III.A.2. Form and validate conjectures about one-, two-, and three-dimensional figures and their properties.</li> </ul> </li> <li>◊ VII.B. Problem Solving and Reasoning – Proportional reasoning                   <ul style="list-style-type: none"> <li>• VII.B.1. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations.</li> </ul> </li> <li>◊ IX.A. Connections – Connections among the strands of mathematics                   <ul style="list-style-type: none"> <li>• IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems.</li> </ul> </li> </ul> </li> </ul>



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TEKS# SE#	TEKS	SPECIFICITY
<a href="#">7.8</a>	<i>Expressions, equations, and relationships. The student applies mathematical process standards to develop geometric relationships with volume. The student is expected to:</i>	
<a href="#">7.8C</a>	<b>Use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas.</b>	<p>Use</p> <p>MODELS TO DETERMINE THE APPROXIMATE FORMULAS FOR THE CIRCUMFERENCE AND AREA OF A CIRCLE AND CONNECT THE MODELS TO THE ACTUAL FORMULAS</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Circle – a two-dimensional figure formed by a closed curve with all points equal distance from the center               <ul style="list-style-type: none"> <li>◦ Diameter – a line segment whose endpoints are on the circle and passes through the center of the circle</li> <li>◦ Radius – a line segment drawn from the center of a circle to any point on the circle and is half the length of the diameter of the circle</li> <li>◦ Circumference – a linear measurement of the distance around a circle</li> </ul> </li> <li>• Pi (<math>\pi</math>) – the ratio of the circumference to the diameter of a circle</li> <li>• Various models to approximate the formulas for the circumference of a circle               <ul style="list-style-type: none"> <li>◦ Using a string to measure the length around a circle and another piece of string to measure the length of the diameter of the circle                   <ul style="list-style-type: none"> <li>• The length of the string representing the circumference of the circle will be a little more than three times longer than the length of the string representing the diameter of the circle.</li> </ul> </li> <li>◦ Using centimeter cubes to measure the length around a circle and using centimeter cubes to measure the length of the radius of the circle</li> </ul> </li> </ul>

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		<ul style="list-style-type: none"> <li>• The number of centimeter cubes needed to represent the radius of the circle is a little more than one-sixth of the number of centimeter cubes needed to represent the length of the circumference of the circle.               <ul style="list-style-type: none"> <li>◊ Circumference using the diameter of a circle</li> <li>◊ Circumference using the radius of a circle</li> </ul> </li> <li>• Generalizations of models used to determine the approximate formulas for circumference of a circle               <ul style="list-style-type: none"> <li>◊ The circumference of a circle is a little more than three times the length of the diameter of a circle.</li> <li>◊ The circumference of a circle is a little more than three times twice the length of the radius of a circle or a little more than 6 times the radius.</li> </ul> </li> <li>• Connections between models to represent the circumference of a circle and formulas for circumference               <ul style="list-style-type: none"> <li>◊ Formulas for circumference from STAAR Grade 7 Mathematics Reference Materials                   <ul style="list-style-type: none"> <li>• Circumference using the diameter of a circle                       <ul style="list-style-type: none"> <li>◊ <math>C = \pi d</math>, where <math>C</math> represents the circumference of the circle, <math>d</math> represents the diameter of the circle, and <math>\pi</math> represents the approximate number of times the diameter wraps the circumference of the circle.                           <ul style="list-style-type: none"> <li>• The ratio of the circumference to the diameter of the circle is a little more than 3 and denoted by <math>\pi \approx 3.14</math>.</li> </ul> </li> </ul> </li> <li>• Circumference using the radius of a circle                       <ul style="list-style-type: none"> <li>◊ <math>C = 2\pi r</math>, where <math>C</math> represents the circumference of the circle, <math>r</math> represents the radius of the circle, and <math>\pi</math> represents the approximate number of times the radius wraps the circumference of the circle.                           <ul style="list-style-type: none"> <li>• The ratio of the circumference to the radius of the circle is a little more than 6.</li> <li>• The ratio of the circumference to the radius of the circle is twice as much as the ratio of the circumference to the diameter of the circle.</li> <li>• The ratio of the circumference to the diameter of the circle is a little</li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> </ul>

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## Grade 7 Mathematics

TITLE : Unit 07: Circles and Composite Figures

SUGGESTED DURATION : 13 days

TEKS# SE#	TEKS	SPECIFICITY
		<p style="text-align: right;">more than 3 and denoted by <math>\pi \approx 3.14</math>.</p> <ul style="list-style-type: none"> <li>• Area – the measurement attribute that describes the number of square units a figure or region covers               <ul style="list-style-type: none"> <li>◦ Area is a two-dimensional square unit measure.</li> </ul> </li> <li>• Various models to approximate the formula for the area of a circle               <ul style="list-style-type: none"> <li>◦ Cutting a circle into equally sized pieces from the center of the circle to the outside of the circle where the length of the non-curved side is the length of the radius of the circle, then laying the equally-sized pieces next to each other to create a figure similar to the shape of a rectangle                   <ul style="list-style-type: none"> <li>• The area of the rectangle (formed with pieces of the circle) is a little more than three times the length of the radius squared.</li> </ul> </li> <li>◦ Tracing a circle on centimeter grid paper, dividing the circle into four equally sized pieces from the center of the circle, forming squares with three of the four pieces of the divided circle using the radius of the circle as the side length of each square, and using the area of the square that extends beyond the circle to fill the last of the four equally sized pieces                   <ul style="list-style-type: none"> <li>• The number of square centimeters needed to represent the area of the entire circle is a little more than the area of three squares with the radius of the circle as one of the side lengths of the square.</li> </ul> </li> </ul> </li> <li>• Generalization of models used to determine the approximate formula for area of a circle               <ul style="list-style-type: none"> <li>◦ The area of a circle is a little more than three times the length of the radius squared.</li> </ul> </li> <li>• Connections between models to represent the area of a circle and formulas for area of a circle               <ul style="list-style-type: none"> <li>◦ Formula for area of a circle from STAAR Grade 7 Mathematics Reference Materials                   <ul style="list-style-type: none"> <li>• Area of a circle                       <ul style="list-style-type: none"> <li>◦ <math>A = \pi r^2</math>, where <math>A</math> represents the area of the circle, <math>r</math> represents the radius of the circle, and <math>\pi</math> represents the approximate number of squares, with a side length of <math>r</math>, needed to fill the area of the circle.                           <ul style="list-style-type: none"> <li>• The ratio of the area of the circle to the area of the radius squared is a little more than 3 and denoted by <math>\pi \approx 3.14</math>.</li> </ul> </li> </ul> </li> </ul> </li> </ul> </li></ul>

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		<p>Note(s):</p> <ul style="list-style-type: none"> <li>• Grade Level(s):               <ul style="list-style-type: none"> <li>◊ Grade 7 introduces using models to determine the approximate formulas for the circumference and area of a circle and connecting the models to the actual formulas.</li> <li>◊ Grade 8 will solve problems involving the volume of cylinders, cones, and spheres.</li> <li>◊ Grade 8 will use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders.</li> <li>◊ Grade 8 will determine the volume of cylinders and cones and the surface area of cylinders.</li> <li>◊ Various mathematical process standards will be applied to this student expectation as appropriate.</li> </ul> </li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◊ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◊ III.A. Geometric and Spatial Reasoning – Figures and their properties                   <ul style="list-style-type: none"> <li>• III.A.2. Form and validate conjectures about one-, two-, and three-dimensional figures and their properties.</li> </ul> </li> <li>◊ III.C. Geometric and Spatial Reasoning – Connections between geometry and other mathematical content strands                   <ul style="list-style-type: none"> <li>• III.C.1. Make connections between geometry and algebraic equations.</li> </ul> </li> <li>◊ III.D. Geometric and Spatial Reasoning – Measurements involving geometry and algebra                   <ul style="list-style-type: none"> <li>• III.D.3. Determine indirect measurements of geometric figures using a variety of methods.</li> </ul> </li> <li>◊ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics                   <ul style="list-style-type: none"> <li>• VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing.</li> </ul> </li> </ul> </li> </ul>

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		<ul style="list-style-type: none"> <li>◊ VIII.B. Communication and Representation – Interpretation of mathematical work               <ul style="list-style-type: none"> <li>● VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.</li> </ul> </li> <li>◊ IX.A. Connections – Connections among the strands of mathematics               <ul style="list-style-type: none"> <li>● IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems.</li> </ul> </li> </ul>
<a href="#"><u>7.9</u></a>	<i>Expressions, equations, and relationships. The student applies mathematical process standards to solve geometric problems. The student is expected to:</i>	
<a href="#"><u>7.9B</u></a>	<b>Determine the circumference and area of circles.</b> <i>Readiness Standard</i>	<p>Determine</p> <p>THE CIRCUMFERENCE AND AREA OF CIRCLES</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> <li>● Positive rational numbers – the set of numbers that can be expressed as a fraction <math>\frac{a}{b}</math>, where <math>a</math> and <math>b</math> are counting (natural) numbers</li> <li>● Various forms of positive rational numbers               <ul style="list-style-type: none"> <li>◊ Counting (natural) numbers</li> <li>◊ Decimals</li> <li>◊ Fractions</li> </ul> </li> <li>● Circle – a two-dimensional figure formed by a closed curve with all points equal distance from the center               <ul style="list-style-type: none"> <li>◊ Diameter – a line segment whose endpoints are on the circle and passes through the center of the circle</li> </ul> </li> </ul>

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		<ul style="list-style-type: none"> <li>◊ Radius – a line segment drawn from the center of a circle to any point on the circle and is half the length of the diameter of the circle</li> <li>◊ Semicircle – half of a circle</li> <li>◊ Quarter circle – one-fourth of a circle</li> <li>◊ Circumference – a linear measurement of the distance around a circle</li> <li>• Pi (<math>\pi</math>) – the ratio of the circumference to the diameter of a circle               <ul style="list-style-type: none"> <li>◊ <math>\pi \approx 3.14</math> or <math>\frac{22}{7}</math></li> </ul> </li> <li>• Formulas for circumference from STAAR Grade 7 Mathematics Reference Materials               <ul style="list-style-type: none"> <li>◊ Circumference using the radius of a circle                   <ul style="list-style-type: none"> <li>• <math>C = 2\pi r</math>, where <math>C</math> represents the circumference of the circle and <math>r</math> represents the radius of the circle, and <math>\pi</math> is approximately 3.14 or <math>\frac{22}{7}</math></li> </ul> </li> <li>◊ Circumference using the diameter of a circle                   <ul style="list-style-type: none"> <li>• <math>C = \pi d</math>, where <math>C</math> represents the circumference of the circle, <math>d</math> represents the diameter of the circle, and <math>\pi</math> is approximately 3.14 or <math>\frac{22}{7}</math></li> </ul> </li> </ul> </li> <li>• Area – the measurement attribute that describes the number of square units a figure or region covers               <ul style="list-style-type: none"> <li>◊ Area is a two-dimensional square unit measure.</li> <li>◊ Positive rational number dimensions</li> </ul> </li> <li>• Formula for area of a circle from STAAR Grade 7 Mathematics Reference Materials               <ul style="list-style-type: none"> <li>◊ Area                   <ul style="list-style-type: none"> <li>• <math>A = \pi r^2</math>, where <math>A</math> represents the area of the circle, <math>r</math> represents the radius of the circle, and <math>\pi</math> is approximately 3.14 or <math>\frac{22}{7}</math></li> </ul> </li> </ul> </li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• Grade Level(s):</li> </ul>

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## Grade 7 Mathematics

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TEKS# SE#	TEKS	SPECIFICITY
		<ul style="list-style-type: none"> <li>◊ Grade 6 determined solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.</li> <li>◊ Grade 8 will solve problems involving the volume of cylinders, cones, and spheres.</li> <li>◊ Grade 8 will use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders.</li> <li>◊ Various mathematical process standards will be applied to this student expectation as appropriate.</li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◊ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◊ I.A. Numeric Reasoning – Number representations and operations                   <ul style="list-style-type: none"> <li>• I.A.2. Perform computations with rational and irrational numbers.</li> </ul> </li> <li>◊ III.D. Geometric and Spatial Reasoning – Measurements involving geometry and algebra                   <ul style="list-style-type: none"> <li>• III.D.1. Find the perimeter and area of two-dimensional figures.</li> </ul> </li> <li>◊ VII.A. Problem Solving and Reasoning – Mathematical problem solving                   <ul style="list-style-type: none"> <li>• VII.A.3. Determine a solution.</li> </ul> </li> </ul> </li> </ul>
<u>7.9C</u>	<p><b>Determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles.</b></p> <p><i>Readiness Standard</i></p>	<p>Determine</p> <p>THE AREA OF COMPOSITE FIGURES CONTAINING COMBINATIONS OF RECTANGLES, SQUARES, PARALLELOGRAMS, TRAPEZOIDS, TRIANGLES, SEMICIRCLES, AND QUARTER CIRCLES</p> <p>Including, but not limited to:</p>

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		<ul style="list-style-type: none"> <li>• Positive rational numbers – the set of numbers that can be expressed as a fraction <math>\frac{a}{b}</math>, where <math>a</math> and <math>b</math> are counting (natural) numbers</li> <li>• Various forms of positive rational numbers               <ul style="list-style-type: none"> <li>◊ Counting (natural) numbers</li> <li>◊ Decimals</li> <li>◊ Fractions</li> </ul> </li> <li>• Two-dimensional figure – a figure with two basic units of measure, usually length and width</li> <li>• Composite figure – a figure that is composed of two or more two-dimensional figures               <ul style="list-style-type: none"> <li>◊ Rectangles</li> <li>◊ Squares</li> <li>◊ Parallelograms</li> <li>◊ Trapezoids</li> <li>◊ Triangles</li> <li>◊ Circles</li> <li>◊ Semicircles</li> <li>◊ Quarter circles</li> <li>◊ Any combination of these figures</li> </ul> </li> <li>• Area – the measurement attribute that describes the number of square units a figure or region covers               <ul style="list-style-type: none"> <li>◊ Area is a two-dimensional square unit measure.</li> <li>◊ Positive rational number side lengths</li> </ul> </li> <li>• Formulas for area from STAAR Grade 7 Mathematics Reference Materials               <ul style="list-style-type: none"> <li>◊ Triangle                   <ul style="list-style-type: none"> <li>• <math>A = \frac{1}{2}bh</math>, where <math>b</math> represents the length of the base of the triangle and <math>h</math> represents the height of the triangle</li> </ul> </li> <li>◊ Rectangle or parallelogram                   <ul style="list-style-type: none"> <li>• <math>A = bh</math>, where <math>b</math> represents the length of the base of the rectangle or parallelogram and <math>h</math> represents the height of the rectangle or parallelogram</li> </ul> </li> </ul> </li> </ul>



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		<ul style="list-style-type: none"> <li>◊ Trapezoid               <ul style="list-style-type: none"> <li>• <math>A = \frac{1}{2}(b_1 + b_2)h</math>, where <math>b_1</math> represents the length of one of the parallel bases, <math>b_2</math> represents the length of the other parallel base, and <math>h</math> represents the height of the trapezoid</li> </ul> </li> <li>◊ Circle               <ul style="list-style-type: none"> <li>• <math>A = \pi r^2</math>, where <math>A</math> represents the area of the circle, <math>r</math> represents the radius of the circle, and <math>\pi</math> is approximately 3.14 or <math>\frac{22}{7}</math></li> </ul> </li> <li>• Problem situations could involve using a ruler to determine side lengths when solving problem situations.</li> </ul> <p>Note(s):</p> <ul style="list-style-type: none"> <li>• Grade Level(s):               <ul style="list-style-type: none"> <li>◊ Grade 6 determined solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.</li> <li>◊ Various mathematical process standards will be applied to this student expectation as appropriate.</li> </ul> </li> <li>• TxRCFP:               <ul style="list-style-type: none"> <li>◊ Using expressions and equations to describe relationships in a variety of contexts, including geometric problems</li> </ul> </li> <li>• TxCCRS:               <ul style="list-style-type: none"> <li>◊ I.A. Numeric Reasoning – Number representations and operations                   <ul style="list-style-type: none"> <li>• I.A.2. Perform computations with rational and irrational numbers.</li> </ul> </li> <li>◊ III.D. Geometric and Spatial Reasoning – Measurements involving geometry and algebra                   <ul style="list-style-type: none"> <li>• III.D.1. Find the perimeter and area of two-dimensional figures.</li> </ul> </li> <li>◊ VII.A. Problem Solving and Reasoning – Mathematical problem solving                   <ul style="list-style-type: none"> <li>• VII.A.3. Determine a solution.</li> </ul> </li> </ul> </li> </ul>

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TEKS# SE#	TEKS	SPECIFICITY

ELPS#	SUBSECTION C: CROSS-CURRICULAR SECOND LANGUAGE ACQUISITION ESSENTIAL KNOWLEDGE AND SKILLS.
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***The English Language Proficiency Standards (ELPS), as required by 19 Texas Administrative Code, Chapter 74, Subchapter A, §74.4, outline English language proficiency level descriptors and student expectations for English language learners (ELLs). School districts are required to implement ELPS as an integral part of each subject in the required curriculum.***

School districts shall provide instruction in the knowledge and skills of the foundation and enrichment curriculum in a manner that is linguistically accommodated commensurate with the student’s levels of English language proficiency to ensure that the student learns the knowledge and skills in the required curriculum.

School districts shall provide content-based instruction including the cross-curricular second language acquisition essential knowledge and skills in subsection (c) of the ELPS in a manner that is linguistically accommodated to help the student acquire English language proficiency.

<http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4>

**Choose appropriate ELPS to support instruction.**

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